United Nations E/CN.18/2004/9

Economic and Social Council

Distr.: General
17 March 2004

Original: English

United Nations Forum on Forests
Fourth session
Geneva, 3-14 May 2004
Item 4 (a) (ii) of the provisional agenda*
Implementation of the proposals for action of the Intergovernmental Panel on Forests/Intergovernmental Forum on Forests and the plan of action of the United Nations Forum on Forests: progress in implementation

Forest-related scientific knowledge

Report of the Secretary-General**

Summary

The present report, prepared for the fourth session of the United Nations Forum on Forests, provides information on the progress in implementation of the proposals for action of the Intergovernmental Panel on Forests (IPF) and the Intergovernmental Forum on Forests (IFF) related to forest-related scientific knowledge.

Progress in strengthening science and policy interaction has been made at the international level, but the degree of interaction and the extent to which forest-related scientific knowledge is used for policy-making varies considerably among countries and tends to be low in particular in developing countries.

A number of information services and systems have been established in recent years, including a global forest information service, facilitated by rapid advancements in information and communication technologies. Related networking activities have reduced duplication of research and facilitated skills development. Nevertheless, the lack of information and communication technologies and related capacity in many countries constitutes a major obstacle for the generation, provision and sharing of forest information.

* E/CN.18/2004/1.

** The delay was due to the need to obtain the necessary clearances.

04-27376 (E) 050404

Forest-related scientific knowledge has been enhanced on a range of environmental, economic and sociocultural aspects of forests as well as on forest policy tools, such as criteria and indicators of sustainable forest management. The need to address cross-sectoral issues, such as forest-poverty linkages, is an emerging challenge for forest research, requiring increased cooperation across disciplinary and institutional boundaries.

Various education and training activities as well as collaborative research networking at all levels have helped enhance the capacity of forest research organizations in many developing countries. Nevertheless, the forest research capacity of developed and developing countries has continued to be significantly disproportionate. Overall, this lack of human and institutional research capacity in many countries constitutes a major factor limiting the contribution of science to sustainable forest management.

Public funding for forest research, including through official development assistance, has been declining in many countries. Private sector investment has increased mostly in developed countries, but has been focused on a limited range of research topics. These developments point to the need to mobilize resources for forest research on all aspects of sustainable forest management.

A number of countries have initiated national forest programmes or similar processes that involve science. Research has contributed to the development of adaptive collaborative management systems and strengthened roles for local communities and indigenous groups, which have contributed to management planning and implementation.

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I. Introduction

1. In adopting its multi-year programme of work at its first substantive session,[1] the United Nations Forum on Forests decided that forest-related scientific knowledge would be addressed at its fourth session. With the inclusion of this element on its agenda, the Forum underlined the importance of enhancing the contribution of research to forest policy and practice.

2. The present report has been prepared to facilitate discussion of forest-related scientific knowledge at the Forum's fourth session. In accordance with the multi-year programme of work, it focuses on describing progress in implementation of the proposals for action of the Intergovernmental Panel on Forests (IPF) and the Intergovernmental Forum on Forests (IFF) related to forest-related scientific knowledge.[2] The report also outlines experiences gained and lessons learned in implementation, and draws attention to internationally significant emerging issues that are relevant to the work of the Forum. The report presents conclusions and points for discussion at the fourth session.

3. The draft of the report was prepared by the International Union of Forest Research Organizations (IUFRO) in collaboration with the Centre for International Forestry Research (CIFOR) and the World Agroforestry Centre (ICRAF) and with significant contributions from other members of the Collaborative Partnership on Forests. Sources of information used to prepare the report include the national reports submitted by States members to the Forum at its fourth session that were available at the time of preparation, information provided by IUFRO member organizations, the proceedings of the International Consultation on Research and Information Systems in Forestry, held at Gmunden, Austria, in September 1998, as well as empirical and case studies, available literature, and Internet sources.

II. Background

4. The international community has recognized the importance of forest-related scientific knowledge in relation to achieving sustainable forest management, including the internationally agreed objectives of sustainable development. The Forest Principles[3] agreed upon at the United Nations Conference on Environment and Development, underline the importance of timely, reliable and accurate information on forests and set out the objective of strengthening scientific research as well as technological developments. Chapter 11 of Agenda 21 adopted by the Conference[4] identifies scientific and technological means in each of its programme areas.

5. The role of forest-related scientific knowledge in policy development and decision-making was also considered by IPF and IFF. IPF addressed forest research under its programme element III, "Scientific research, forest assessment and development of criteria and indicators for sustainable forest management".[5] IPF recognized the need to strengthen research, identified related institutional needs and also recognized the importance of developing and identifying research priorities at all levels. To this end, it set out a number of proposals for action. Building upon the progress made by IPF, IFF further deliberated on forest research under programme element II.D, "Issues that need further clarification".[5] IPF and IFF adopted sets of proposals for action addressing forest-related scientific knowledge.[2] The proposals

for action are summarized in the following table. These summaries are neither negotiated text nor are meant to replace negotiated text. They are provided to facilitate discussion of the proposals for action.

Summary of IPF/IFF proposals for action related to scientific forest-related knowledge

Type of action called for	*Proposals for action*
1. Strengthening interaction between science and policy Improve linkages between scientific research and policy processes and involve guidance from all interested parties	IFF 96 (c), IFF 98 (b)
2. Promoting the provision and efficient sharing of existing information and strengthening networks Make results and information available for all users to support decision-making, develop new and innovative means of disseminating information and technologies and promote and make use of existing networks, institutions and mechanisms in efficient sharing of information	IPF 58 (b) (vii), IPF 94 (a) (ii), IPF 94 (a) (iii), IFF 97 (c), IFF 98 (c)
3. Addressing the knowledge gaps and setting the research priorities Set research needs and priorities nationally, regionally and globally, address knowledge gaps, and promote and strengthen research efforts in support of sustainable forest management	IPF 46 (g), IPF 94 (a) (i), IPF 94 (b), IPF 94 (d), IPF 104 (c), IPF 50 (b), IFF 96 (d), IFF 96 (a), IFF 98 (a), IFF 97 (d)
4. Strengthening research capacity and mobilizing funding for forest research Examine new ways to mobilize funding for forest research to accomplish its objectives and build capacity at the national, regional and global levels (means of implementation)	IPF 94 (a) (iv), IPF 94 (c), IFF 96 (b), IFF 97 (a), IFF 97 (b)
5. Applying participatory mechanisms to integrate research into planning processes (common item)	IPF 17 (e)

III. Implementation of the proposals for action related to forest-related scientific knowledge

A. Strengthening interaction between science and policy

6. Several innovative mechanisms have been established in recent years to facilitate systematic interaction between scientists, policy makers and other stakeholders in order to strengthen interaction between science and policy.

Science-policy interaction at the international level

7. The forest scientific community participates and contributes to the policy process related to forests in intergovernmental bodies, including the subsidiary advisory bodies, task-oriented expert groups and advisory groups set up by forest-relevant global conventions, instruments and organizations. In addition, multi-stakeholder dialogues provide opportunities for science-policy interaction.

8. Cooperation has been strengthened between the scientific community and international organizations, in particular the Food and Agriculture Organization of the United Nations (FAO) and the International Tropical Timber Organization (ITTO), by providing contributions to key publications, such as the FAO *State of the World's Forests* report, and by engaging in joint activities. For example, forest-related scientific knowledge has assisted ITTO in the development of the ITTO criteria and indicators for the sustainable management of natural tropical forests.

9. Increased science-policy interaction has facilitated the focused provision of forest-related scientific knowledge on a number of critical forest policy issues. Science has also played an important role in the development of internationally recognized instruments for sustainable forest management, including criteria and indicators and national forest programmes.

10. The forest scientific community has contributed to the development and implementation of the programme of work on forest biological diversity of the Convention on Biological Diversity,[6] as well as to the understanding of forest-related aspects of climate change and the priority topics "water, energy, health, agriculture and biodiversity" of the World Summit on Sustainable Development (2002). Research has also helped to develop a better understanding of forestry-poverty links. However, in spite of the progress achieved, interaction between science and policy needs to be further strengthened at the international level to enhance research uptake in policy-making and to facilitate research priority setting.

Science-policy interaction at the national and subnational levels

11. Various mechanisms are used to facilitate science-policy interaction at the national and subnational levels. These include, among other mechanisms, forums for the exchange of information, experiences and views, and advisory councils and groups with tasks such as setting research priorities and promoting the dissemination of research results. While intermediary research promotion institutions for providing and allocating funds exist in most countries, very few have established organizations that act as an interface between Governments, practitioners and researchers specifically in the field of forestry.

12. The use of scientific knowledge in policy-making varies considerably among countries. For most of the past century, research, in developing countries in particular, has been focused predominantly on improving economic efficiency in forest production systems and the quality of traded goods or services. For example the IUFRO Task Force on the Science/Policy Interface found that forest policies in Southern Africa have been influenced more by national macroeconomic policies than by developments in forest research.[7] At the same time, a number of examples exist of effective research involvement in addressing other key policy issues. For instance, the Government of Indonesia, through its Centre of Financial Analysis and Transaction, has worked closely with CIFOR in addressing forest-related and environmental crimes as predicate offences in Indonesia's new regulations on money-laundering.

13. National forest programmes or similar processes at the national and subnational levels can help overcome barriers and gaps in the interaction between science and policies.[8] The role of science and research in a national forest programme is typically twofold: first, science and research organizations serve as providers of knowledge and advice concerning practical design options for national forest programme processes and concerning the issues/problems addressed; and second, the scientific community acts as one of the several stakeholders participating in the national forest programme process.

14. In many countries, there is a movement towards the decentralization of government functions and the devolution of forest planning and management responsibilities to lower levels of Government, indigenous and local organizations, the private sector and other stakeholders. Science has contributed significantly to the design of the institutional arrangements and adaptation processes in a number of countries. For example, research has had a clear impact on processes of decentralization in Bolivia, Nicaragua and Zimbabwe.[9]

B. Promoting the provision and efficient sharing of information

15. In recent years, the volume of forest-related scientific information generated globally and the sources of such information have expanded significantly. Increasingly, such information is published and made available through electronic means. Information and communication technologies have advanced rapidly and become far more widely available. They have also significantly facilitated communication and networking among providers and users of information where adequate information and communication technologies infrastructure and facilities exist. At the same time, access to information and communication technologies and their use continue to be unequally distributed on a global scale. Computer illiteracy, limited information and communication technologies facilities and general lack of financial resources in most developing countries limit the full materialization of the benefits of information and communication technologies for sustainable forest management.

16. A commitment and desire was declared at the World Summit on the Information Society to build an information society, where everyone can create, access, utilize and share information and knowledge, enabling individuals, communities and peoples to achieve their full potential in promoting their sustainable development and improving their quality of life.[10] Among other aspects,

the Summit emphasized the need for universal access with equal opportunities for all to scientific knowledge and recognized the creation and dissemination of scientific and technical information as principles of an information society.

Information-sharing and resource discovery

17. Building on one of the key recommendations of the International Consultation on Research and Information Systems in Forestry concerning enhanced access to all forest-related information, IFF requested international organizations to explore possibilities for a global forest information service. Consequently, a IUFRO Task Force has worked to develop the Global Forest Information Service (GFIS), an Internet-based information resource discovery tool that provides access to forest information resources on a global scale.[11]

18. Through GFIS, information resources can be searched and located in multiple formats such as maps, research reports, journal articles and databases. In January 2004, the Service held over 125,000 catalogue records provided by forestry organizations in Africa, Asia, Europe, Latin America and North America. GFIS is the result of an international partnership project involving national and international forestry agencies, research institutes, universities, libraries and other government and non-governmental organizations that promotes the dissemination and sharing of information related to forests and trees.

19. In addition to GFIS, there are other Internet-based bibliographical information services and library networks which facilitate the location of forest-related information. For example, the "Info Finder", established by the Consultative Group on International Agricultural Research (CGIAR) in collaboration with the FAO World Agricultural Information Centre and Future Harvest Centres, allows searching for digital information on the web sites of these institutions.[12] Bibliographical information services are also provided through CABI Publishing, the FAO International Information System for the Agricultural Sciences and Technology and the IUFRO online reference library, known as DABIS.[13]

20. Progress has also been made in recent years in the development of information services and systems at regional levels. For example, the Agricultural Information and Documentation System for the Americas (SIDALC)[14] provides access to agricultural information, including forest-related information, on the basis of a decentralized network of national agricultural information systems. The GFIS-Africa Project focuses on improving access to scientific information by means of capacity-building in regional research institutions and sharing experience and good practice in information management. Efforts in the European region have resulted in the development of a prototype of a European Forest Information System.[15]

Dissemination of information

21. In addition to providing search facilities for locating information, numerous Internet-based mechanisms have been established for the dissemination of forest science information. These include electronic list-servers, peer-to-peer announcement lists, and topic pages on web sites, among other things. Information circulated through these mechanisms ranges from research results to directories of forest-related libraries, documentation centres and subject specialists. Increasingly, extension services are making use of modern information and communication technologies, such as the Internet.

22. The use of dissemination strategies based on technological media is, however, limited mainly to the developed world. The digital and knowledge divide — particularly the gap between those with and without access to the Internet — continues to be a challenge in the world. International forest research organizations have found that while most forest research institutions in developing countries are connected to the Internet, only some are equipped with computer networks, and several have only shared use of Internet or e-mail access.[16] Internet-based means of disseminating information, such as electronic journals, can therefore become "gatekeepers" that largely exclude the developing world.

23. Printed publications continue to be a vital means of information dissemination. Nevertheless, the differences in the number of scientific articles published in developed and developing regions hint at the imbalances in science and technology capacity between different regions of the world. According to the *State of the World's Forests 2003*, in 1999 about 70 per cent of all scientific articles were published in North America and Western Europe, while less than 1 per cent originated from sub-Saharan Africa.[17]

24. Despite the advances in information and communication technologies in past years, only a few forest research organizations have developed interactive strategies for dissemination of forest-related scientific knowledge. The IUFRO Task Force on Public Relations in Forest Science has studied some research activities that focus on ways and means of disseminating research findings. For example, the European Union funded research project on indicators and tools for restoration and sustainable management of forests in East Africa has identified two major factors contributing to successful dissemination of forest-related scientific knowledge: partnerships with forest user groups, and contacts and links with forestry projects and programmes in the regions.[18]

C. Addressing knowledge gaps and setting priorities

25. At the global level, the IPF/IFF proposals for action contain a number of issues on which countries and international organizations could promote research topics. Based on that, at the regional levels, forest research priorities could be further defined. In this regard, networks such as the Asia-Pacific Association of Forestry Research Institutions and the Forestry Research Network for Sub-Saharan Africa, and meetings, such as the Regional Meetings on Forestry Research in Latin America at Curitiba, Brazil, in November 1999 and in Central Africa in Libreville in December 2001 and meetings organized by the European Forest Institute have shown tremendous potentials for priority setting for research at regional levels.

26. Forest research can also enhance understanding of forest ecosystem dynamics and functions as well as of the broad range of factors that affect forest health and productivity, such as climate change, storms, insects, diseases, invasive species and forest fires. For example, research on forest fires carried out in Brazil showed that threats and effects of recurrent forest fires in the Brazil Amazon were much higher than previously believed.[19] As a result, a government programme specifically addressing forest fires was initiated.

27. One of the key priorities for forest research is to build up comprehensive knowledge about the various economic and social benefits provided by forests. The ongoing development of sound valuation methodologies for forest goods and

services, together with the provision of market and trade-related data and information, and market-based policy instruments enable society better to capture the multiple social and economic benefits provided by forests. The work of CIFOR in Cameroon is one successful example in this direction. In 2003, it accelerated the dissemination of market information (market trends, product specialization, storage and availability of raw materials) to improve marketing strategies and incomes of local communities and traders of forest products (with a large focus on non-wood products). Preliminary results indicate that traders could increase their incomes significantly as a result of this market information.

28. A clear focus on stakeholder needs can help enhance the usefulness of forest research. Experiences, gained through using adaptive collaborative management approaches, have led to successes on the ground at research sites in Zimbabwe, Nepal, Bolivia, Malawi and the Philippines. Likewise, one of the workshops of the IUFRO Task Force on the Science/Policy Interface, held at Chennai, India, in 2002, concluded that obtaining feedback in the research process and using that feedback to guide research priorities is critical for making research relevant to potential users.[20]

29. Despite the progress achieved in recent years, the lack of human and institutional research capacity in many developing countries has continued to be a major limiting factor. In most countries the capacity is constrained by, inter alia, lack of political commitment to forest research, lack of a critical mass of scientists and expertise in many areas, inadequate funding for research programmes, poor systems of communication and transfer of research results to potential users, duplication of research efforts and lack of strategic planning.[21] There is also a clear need to develop research strategies that reflect country and regional priorities and capabilities.

D. Strengthening research capacity

30. Strengthening forest research capacity involves essential components such as training and education, collaborative research networking and information access and management.

31. Increasing the efficiency and effectiveness of human resources through training and education is a crucial means of enhancing forest research capacity. In order better to integrate scientific results into policy and management, IUFRO has developed a new strategic plan for the period 2002-2005 under its Special Programme for Developing Countries, with special emphasis on training topics related to the science-policy/management interface.[22] The Special Programme for Developing Countries also promotes research and networking activities among developing countries. The Forestry Research Support Programme for Asia and the Pacific, executed by FAO, is another effort assisting research institutions in strengthening their science and technology capabilities in forestry research.

32. The quality of education plays a key role in the quality of research and practical forest work. Moreover, collaboration between research and development institutions and universities contributes to the accomplishment of research objectives and helps make more efficient use of scarce research funds. At the regional level, a number of organizations promote collaboration between research and education. These include, inter alia, the Tropical Agricultural Research and Higher Education Centre and two networks attached to ICRAF, namely the African

Network for Agroforestry Education and the Southeast Asian Network for Agroforestry Education.

33. Strengthening communication and collaboration among researchers by means of networking constitutes an essential aspect of capacity-building. One important criterion for the success of a network is its ability to mobilize a critical mass of individuals and/or institutions that wish to collaborate. At the global level, IUFRO has been promoting cooperation among forest research organizations and scientists by providing a well-established thematic organizational structure for science collaboration. Fostering shared learning across countries helps science programmes remain innovative and more responsive and relevant to policy makers.

34. A number of regional networks have been established to promote research collaboration and strengthen research capacity in support of national and regional development. Networks established to date include the Asia-Pacific Association of Forestry Research Institutions, which was established in 1995 and has 63 member institutions, and the Forestry Research Network for Sub-Saharan Africa, which was established in 2000 and covers 41 sub-Saharan countries. In Latin America, a Forum of Heads of Forestry Research in Latin America was formed in 2001. FAO and IUFRO are collaborating with other partners in supporting these regional networking activities. The Asia-Pacific Association of Forestry Research Institutions has been recognized by IUFRO as its Regional Chapter for Asia and the Pacific.

35. The European Tropical Forest Research Network promotes communication among European research organizations and scientists concerning forests in tropical and subtropical countries. The European Forest Institute promotes, conducts and cooperates in forest research at the pan-European level.

IV. Experiences and lessons learned

Strengthening interaction between science and policy

36. In many cases it is found that policy makers do not use findings of a specific scientific study to take a policy decision.[23] Rather, research findings tend gradually to clarify issues and their interlinkages and/or introduce new concepts that may eventually influence policy decisions. Thus, even though research findings may not be directly employed in formulating specific policies, they do influence policy through the way issues are framed and understood.

37. The scientific community and the policy makers often have different expectations from each other. For example, research organizations are frequently confronted with the difficulty of balancing long-term forest research with the more immediate information requirements of policy makers. Continuous interaction and collaboration of research with policy actors and other stakeholders at various levels is likely to facilitate the formulation of strategies that will enhance the use and impact of research.

38. Mechanisms established at the international level have facilitated closer links between forest policy-making and forest-relevant science. However, despite the progress achieved, use of science in international policy deliberations needs to be further enhanced. More than that, stronger efforts are needed to facilitate science-

policy interaction within countries. In this respect, the existing lack of human and financial resources and inadequate communication constitute major bottlenecks for conveying scientific information effectively from the "science system" to the "policy system".[20] Therefore, stronger support of national governments and international cooperation programmes for expanding the participation, communication and networking capacities of national and subnational research organizations is essential. At the same time, stronger incentives need to be provided for scientists to engage in policy deliberation processes.

39. Contributing articles to key publications of intergovernmental organizations and processes and international non-governmental organizations have proved to be an important means for research organizations to disseminate research findings to potential users and to help shape national debates on topical issues, for example, forest concession policies, trade restrictions, government subsidies, deforestation, community forestry and similar decentralization arrangements.[24]

40. Often, the terminology used by scientists is perceived as being too technical and thus difficult for policy makers and practitioners to understand. Presentation of research-based information in language that is readily understood by policy makers and the general public will help increase its use.

Promoting the provision and efficient sharing of information

41. New information and communication technologies, with the Internet as the key vehicle, have significantly enhanced the provision and sharing of forest-related information worldwide. The development of GFIS contributes to meeting the need articulated by IFF for efficient sharing of information.

42. Experiences gained in the development of GFIS and in regional forest information services and systems underline the efficacy of building collaborative initiatives on existing regional and national networks, therewith improving coordination and reducing duplication of research. Sharing of expertise and experiences among participating organizations enables mutual learning and supports more harmonized approaches to the provision and management of forest-related information at a global scale.

43. At the same time, the existence of suitable information and communication technologies infrastructure is central to the provision and efficient sharing of forest-related information. Therefore, investments to enhance forest research capacity specifically need to address the lack of information and communication technologies infrastructure in forest research organizations, particularly in developing countries.

44. Development of the necessary skills is essential in order to benefit fully from new technologies. Stronger efforts are required to strengthen the capacity of forest research organizations in developing countries for generating forest-related data and information and for providing it by means of new technologies and mechanisms. For example, capturing the full potential of GFIS on a sustained basis will depend on the ability of research and other organizations all over the world to provide a critical mass of forest-related information.

45. Dissemination of forest-related scientific knowledge can be enhanced by problem-focused and mutual learning processes that involve communities and other stakeholders. However, links between organizations conducting forest-related research and user groups are often inadequate.

Addressing knowledge gaps and setting priorities

46. Science and technology have made significant contributions to addressing knowledge gaps at local, national, regional and global levels and to the implementation of many IPF/IFF proposals for action. At the same time, the lack of human and institutional research capacity in many developing countries has resulted in significant imbalances in research outputs globally and has continued to be a major factor limiting effective, relevant and timely scientific contributions in these countries.

47. Involvement of science in both policy and management planning has underlined the importance of developing a stronger focus on stakeholder needs. Forest research needs to increasingly adopt new, "client-driven" research agendas and approaches. In this respect, it is crucial to understand the needs of the intended audiences — including those of policy makers, forest owners, local communities, indigenous communities and other potential users of technologies and information — at an early stage in the research process.

48. While forest research in general has a good track record in producing solutions, evidence suggests that research findings are often not adopted. In setting priorities research organizations must therefore consider not only the importance of the problem to be addressed and the potential benefits of related research, but also the ease or difficulty for beneficiaries of capturing those benefits. Institutional and economic factors often have a strong influence on whether or not forest-related scientific knowledge is applied and therefore need to be taken into due consideration. Accompanying thematic research with an in-depth analysis of existing constraints to adoption of the results should, over the long run, help improve adoption rates.

Strengthening research capacity

49. The forest research capacity of developed and developing countries has continued to be significantly disproportionate. Developing countries face a number of constraints to research. For example, in Africa the following conditions prevail in many countries: insufficient collaborative research; poor linkages between research and intended users; inadequate flow of information and access to scientific literature; low levels of remuneration for researchers; and a lack of continuity in research programme support.[16] Strong efforts are needed by countries and the international community to overcome these constraints.

50. One of the most important components of research in developing countries is trained research scientists. The sustainability of applied research and development activities largely depends on inflow of new talent and a solid national research base in applied forestry fields. Therefore, building new expertise through training and education of scientists constitutes a key mechanism for transferring forest-related scientific knowledge to developing and economically disadvantaged countries.

51. Regional forest research networks constitute an essential tool for improving communication among scientists. Regional networking and collaboration in research have been shown to be efficient means for solving problems that are common to a broad geographic area, reducing duplication of scientific efforts, providing opportunities for complementary work and building a critical mass of scientists. Research networks involving government agencies, academia, and the private sector have also helped build stakeholder involvement. Nevertheless, further development of regional networks to serve as mutual learning platforms could further enhance their role in capacity-building.

V. Means of implementation: funding for forest research

52. Government funding for forest research has been decreasing in many developing countries, in part as a result of structural adjustment programmes that impose budgetary restrictions. Moreover, official development assistance, on which many least developed countries — especially in South Asia and sub-Saharan Africa — are dependent, has declined in recent years (see E/CN.18/AC.2/2003/2). Shifts in priorities of international donors may also disrupt the continuity of recipients' research programmes.

53. In contrast to the decrease in public funding, the share of private research funding has been increasing, in developed countries in particular. Often, countries have used public funding to create a favourable environment for private sector investment in forest research. Generally the private sector focuses on applied research in areas that provide competitive economic advantages, but it has been difficult to attract private sector investment in research addressing public benefits, such as environmental services derived from the forests

54. At the international level, significant funding support for research is provided by CGIAR, which supports a total of 16 international research centres, two of which — CIFOR and ICRAF, deal with forest issues. In addition, the Global Environment Facility (GEF) provides funding for forest-related programmes and projects, including research. Forest-related projects account for more than 50 per cent of the total GEF biodiversity portfolio.[25] GEF also recognizes the role of science through its scientific and technical advisory panel. In addition to these funding sources, various instruments established at the regional level provide financial support for international science cooperation.[26]

55. Public funding continues to be of vital importance for forest research all over the world and is of particular relevance for developing countries. In several of these countries, a considerable proportion of financial support to forest research is provided by development assistance agencies. During the last decade, the priorities of the donor organizations have changed towards a stronger focus on sustainable development. Therefore, in order to attract resources, an increasing share of forest research needs to be placed in the context of broader environmental and socio-economic issues — for example, concerning the role of forests in water resource management, food security or, more broadly, the eradication of poverty — in response to more integrated approaches to sustainable development.

56. In addition, there is a need to better communicate and demonstrate the positive impact of forest research. As with research in many fields, there is often a lack of information and accountability regarding the "on the ground impact" of forest

research, particularly where environmental service and livelihood-related benefits are key goals. This perceived accountability gap is a particular challenge when aiming to increase the investment in forest research.

VI. Emerging issues

Targeted research for decision-making

57. There currently does not exist a process for pooling scientific and technical information from past and ongoing research initiatives relevant to sustainable forest management. A wealth of scientific information on sustainable forest management has been generated throughout the past century. Moreover, since 1990, forestry research has responded to the challenges posed by climate change, biodiversity loss, land degradation and desertification, and unsustainable use of forests. New initiatives include, among others, the global forest-related research programmes of CGIAR, the Millennium Ecosystem Assessment, the Tropical Forest Canopy Programme and its Canopy Research Network and the Centre for Tropical Forest Science, a voluntary consortium of forest agencies, universities, research institutes and non-governmental organizations in 14 countries in Asia, Africa and Latin America.

58. These are but a few, although very important examples of the increased attention given to forest-related scientific research over the past decade. The challenge facing scientists, managers and policy makers is to integrate this vast, complex information and data into a user-friendly scientific and technical knowledge base in support of sustainable forest management, including the development and adaptation of new environmentally sound technologies and management practices.

59. Moreover, the integration of scientific outputs from various research initiatives is fundamental in identifying gaps in the knowledge base and areas requiring attention by the scientific community in the future. To achieve sustainable forest management, greater efforts are required to synthesize existing scientific information and traditional forest-related knowledge, as well as the results of ongoing forest-related research programmes, and to develop a global agenda for targeted research, especially on tropical forests, that responds to the most pressing needs for information and know-how facing managers and decision makers.

Interdisciplinary research crossing sectoral boundaries

60. The deliberations of global and regional organizations, institutions and processes addressing sustainable development, forest biological diversity, climate change, forest law enforcement and governance and other cross-cutting forest-relevant issues have indicated that effective forest-related policies require coordinated and integrated approaches across sectoral boundaries. This need for cross-sectoral approaches is an emerging challenge for forest research as well. Against the background of 1 billion of the world's people living in extreme poverty, there is an urgent need to generate more forest-related scientific knowledge about the linkage between forests and poverty and forests' contribution to poverty alleviation. Also, addressing agroforestry, soil and water conservation, food security,

energy, medicines and cultural values, requires an integrated approach combining different research fields and disciplines.

61. Information provided by research organizations indicates that the lack of forest-related scientific knowledge on a number of cross-sectoral issues as well of uptake of forest-related scientific knowledge by policy makers and practitioners is frequently a result of an insufficient ability of research organizations to establish meaningful interactions and linkages among different research fields and disciplines, including between the natural and social sciences. Greater efforts are needed to adapt intra-institutional structures and processes within research organizations and to establish suitable mechanisms for inter-institutional cooperation. In this regard, a workshop organized by FAO, the Forestry Research Support Programme for Asia and the Pacific and the Asia-Pacific Association of Forestry Research Institutes in Dehra Dun, India, in 2003 explored institutional changes needed in the Asia-Pacific region to address the new roles for forestry research, development and training agencies in the specific context of poverty alleviation.[27] It was clearly highlighted by the participants of the workshop that, with few exceptions, national research, development and training agencies in the region have to reshape themselves to meet the new demands and additional new roles.

Integration of science and research in management planning

62. International and national research organizations and institutions have taken various initiatives aimed at integrating science and research in management planning. Adaptive collaborative management has emerged as an approach that can help improve the management of natural resources and assist local communities in problem solving through collaboration, learning together and collective action. Related research focuses on developing and testing the concepts, management principles, tools and policy options needed to help strengthen the application of adaptive collaborative management.

63. In recent years, application of adaptive collaborative management in various places has had positive impact, including: marginalized groups have been successfully integrated into formal forest management activities; the role and contributions of local communities in decision-making have been strengthened; negotiation and conflict management skills have been developed; information networks have been expanded; and monitoring skills have been strengthened. Concerted effort is needed, however, by policy and decision makers to further improve institutional arrangements at the local level and to strengthen collaborative processes in formal forest management.

Mobilizing resources for forest research on all aspects of sustainable forest management

64. The changes in funding structures, especially the decrease in public funding and the potential increase in private funding, underline the need to develop and/or adapt strategies that facilitate research related to all dimensions of sustainable forest management and sustainable development. Ways to attract private funding for research related to ecological and social benefits of forests and sustainable forest management especially need to be sought.

VII. Conclusions

65. Science has made significant contributions to enhancing knowledge about the issues addressed in the IPF/IFF proposals for action and has provided scientific input to the global deliberations on forests and forest-related issues, including biodiversity, climate change and overall sustainable development.

66. The mechanisms put in place at the international level have facilitated science-policy interaction and enabled mutual learning. However, linkages between science and policy are still weak in many countries. Strengthening science-policy interaction continues to be of high priority. It is crucial to support and expand participation, communication and networking capacities of national and subnational research organizations and individual scientists in particular in developing countries, and to provide opportunities and incentives for stronger engagement of scientists at the science-policy interface. An exchange of experiences gained and lessons learned in the formulation and implementation of national forest programmes that involve science could help to further advance adaptive and participatory policy planning processes.

67. The further development and increased availability of information and communication technologies have enabled more efficient dissemination of forest-related scientific information. However, the lack of information and communication technology infrastructure and insufficient related skills of forest research organizations, in developing countries in particular, are major constraints to providing access to forest-related information. Continued and enhanced efforts are needed to provide necessary information and communication technologies infrastructure, develop related skills and support networking activities.

68. Global and regional deliberations regarding forest biological diversity, climate change, forest law enforcement and governance and poverty eradication, and other cross-cutting forest-relevant issues have underlined the importance of integrated approaches and multidisciplinary research.

69. Existing weaknesses in communication and collaboration across disciplines and among organizations is a major constraint to the development of integrated approaches. There is a need for national research institutions, with regional and international assistance, to develop intra-institutional structures and processes and enhance their capacity for inter-institutional and multidisciplinary cooperation both within and between countries.

70. Recent trends in research funding require innovative strategies by forest research organizations concerning the allocation of funds both within countries and internationally. While the private sector offers funding opportunities in research areas that provide competitive advantages for potential investors, trends in public financing emphasize the contributions of forest research to broader sustainable development objectives. This reflects the high importance of promoting stronger integration of forest research with priority areas of sustainable development, in particular those where forest research activities can help to address the problems of local communities and poor forest-dependent people.

71. **The application of forest science to forest management planning has helped translate research results into practical application and has facilitated feedback to researchers from users of the research. Community-based research and development can narrow the gap between researchers and resource managers and help overcome the perceived "accountability gap" regarding the "on the ground impact" of forest research.**

VIII. Points for discussion

72. **The Forum may wish to consider the following points for discussion:**

(a) **Improve the linkages between science and policy by enhancing the capacities of national and subnational research organizations and individual scientists, in particular in developing countries, to participate in policy development processes, and by providing incentives for scientists' engagement at the science-policy interface;**

(b) **Request the Forum secretariat and other members of the Collaborative Partnership on Forests to facilitate joint actions to further improve linkages and to improve communication and networking between science, forest policy and civil society, including the promotion of global forest information services;**

(c) **Encourage international organizations and financing institutions to enhance the capacity of research organizations, in developing countries in particular, in generating and accessing forest-related data and information through information and communication technologies infrastructure, in strengthening the skills of researchers, and in supporting networking activities;**

(d) **Encourage States members of the Forum and international organizations to support and strengthen emerging regional forest research networks in capacity-building, regional cooperation, and articulating regional research agendas;**

(e) **Recommend that member States, together with international and regional organizations, institutions, processes and various stakeholders, recognize the contribution of forest research to the priority areas in support of sustainable forest management;**

(f) **Encourage international and regional organizations, institutions, processes and various stakeholders to promote and support interdisciplinary research both within and between national and international research organizations;**

(g) **Encourage member States and international organizations and financing institutions to increase public funding for research addressing environmental and social benefits of forests;**

(h) **Request Partnership members to support coordinated action by international and national forest research organizations in providing more policy-relevant and problem-oriented forest research responding to the diverse needs of stakeholders, to further increase interaction between the scientific community and other members of civil society and the private sector, and to**

further encourage the expansion of interdisciplinary research by means of increased networking and collaboration;

(i) **Encourage member States to consider establishment of a standing scientific body to advise the Forum and its member States on the scientific, technical and technological aspects of sustainable forest management. This body could also assist in the assessment of scientific, technical and technological factors affecting the implementation of the IPF/IFF proposals for action.**

Notes

[1] E/CN.18/UNFF/2001/Part II (see www.un.org/esa/forests/multi-year-work.html).

[2] For the texts, see www.un.org/esa/forests/pdf/ipf-iff-proposalsforaction.pdf.

[3] *Report of the United Nations Conference on Environment and Development, Rio de Janeiro, 3-14 June 1992*, vol. I, *Resolutions Adopted by the Conference* (United Nations publication, Sales No. E.93.I.8 and corrigendum), resolution 1, annex III (Non-legally Binding Authoritative Statement of Principles for a Global Consensus on the Management, Conservation and Sustainable Development for All Types of Forests).

[4] *Report of the United Nations Conference on Environment and Development, Rio de Janeiro, 3-14 June 1992*, vol. I, *Resolutions Adopted by the Conference* (United Nations publication, Sales No. E.93.I.8 and corrigendum), resolution 1, annex II.

[5] See E/CN.17/1997/12, paras. 4 (c) and 79-115.

[6] See www.biodiv.org/decisions/default.aspx?dec=VI/22.

[7] H. O. Kojwang, "Forest science and forest policy development: the challenges of Southern Africa", paper presented at the International IUFRO Workshop on the Forest Science/Policy Interface in Europe, Africa and the Middle East, Copenhagen, June 2003.

[8] M. Pregernig, "Linking knowledge and action: the role of science in national forest programmes processes", 2004 (to be published).

[9] "Forests and people, research that makes a difference", CIFOR, 2003.

[10] Declaration of Principles, Building the Information Society: a global challenge in the new Millennium document WSIS-03/GENEVA/DOC/4-E.

[11] www.gfis.net/.

[12] http://infofinder.cgiar.org.

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[14] http://orton.catie.ac.cr.

[15] www.ec-gis.org/efis.

[16] M. J. Spilsbury, and others, "Forest-related Research Capacity in Eastern Africa: Burundi, Eritrea, Ethiopia, Kenya, Sudan, Tanzania and Uganda", 2004, FAO, CIFOR, African Evaluation Association research report.

[17] See www.fao.org/forestry/SOFO.

[18] www.uni-freiburg.de/waldbau/I-TOO/I-TOO-files/WP/I-TOO%20WP%2013.pdf.

[19] The Woods Hole Research Centre (www.whrc.org/science/tropfor/setfire.htm) and the Institute for Research on the Amazon (www.ipam.org.br).

[20] Summary of lessons learned through case studies at the International Workshop on "Forest Science and Forest Policy in the Asia-Pacific Region".

[21] M. J. Spilsbury, "Getting forestry research into policy and practice", proceedings of the International IUFRO Workshop on Forest Science and Forest Policy in the Asia-Pacific Region (see http://iufro.boku.ac.at/iufro/taskforce/tfscipol/chennai-papers/fspilsbury.pdf).

[22] www.iufro.org/iufro/spdc/nb-strategicplan.pdf.

[23] J. L. Garret and J. Islam, "Policy research and the policy process: do the twain ever meet?" International Institute for Environment and Development, Gatekeeper Series No. 74, 1978, London.

[24] M. J. Spilsbury and D. Kaimowitz (2000) "The influence of research and publications on conventional wisdom and policies affecting forests", Unasylva, 2003, www.fao.org/docrep/x8080e/x8080e02.htm.

[25] "Forests matter, early release", GEF, Washington, D.C., September 2003.

[26] For example, the Sixth Framework Programme of the European Commission for 2002-2006.

[27] Workshop on Forests for Poverty Reduction: the Changing Role of Research and Development Institutions, Dehra Dun, India, April 2003.